**PERCENTAGE LOG OF WATER-WELL CUTTINGS**
UTAH GEOLOGICAL SURVEY

DWRi Appropriation #: 09-1052 (A51422) Well Owner: Holliday, Jason
Location: (D-36-22)12cca, San Juan County, Utah Win #: 430621
Driller: Beeman Drilling Company Geologist: Janae Wallace, 1/14/08

| **Depth Range** (feet) | | **PERCENTAGES** | | | | | | **COMMENTS** |
|---|---|---|---|---|---|---|---|---|
| | | unc* | disaggregated | | consolidated | | | |
| | | sand/ gravel | ms* | ss* | ms* | ss* | ls* | |
| 0 | 20 | 100 | 0 | 0 | 0 | 0 | 0 | tan and gray clay, silt, and sand (75%) with gravel (25%) composed of sandstone, siltstone, chert, limestone, and igneous rock fragments; calcareous |
| 20 | 40 | 100 | 0 | 0 | 0 | 0 | 0 | tan and gray gravel composed of sandstone, siltstone, chert, limestone, and igneous rock fragments; calcareous |
| 40 | 60 | 5 | 0 | 0 | 95 | 0 | 0 | gray and tan with trace yellow volcanic rock gravel and mudstone/shale; calcareous; Dakota Sandstone? |
| 60 | 80 | 50 | 50 | 0 | 0 | 0 | 0 | gray, black, and tan clay with gravel; trace pyrite; calcareous |
| 80 | 100 | 25 | 75 | 0 | 0 | 0 | 0 | gray clay with shale, sandstone, and igneous gravel; trace black carbonaceous material; calcareous |
| 100 | 120 | tr | 0 | 0 | 50 | 50 | 0 | gray and black mudstone, shale, and sandstone with trace gravel; trace pyrite and gypsum; slightly calcareous |

*unc=unconsolidated; ms=mudstone, sandy mudstone, and siltstone; ss=sandstone; ls=limestone

| **Depth Range** (feet) | | **PERCENTAGES** | | | | | | **COMMENTS** |
|---|---|---|---|---|---|---|---|---|
| | | unc* | disaggregated | | consolidated | | | |
| | | sand/ gravel | ms* | ss* | ms* | ss* | ls* | |
| 120 | 140 | 0 | 0 | 0 | 50 | 50 | 0 | gray and black mudstone, shale, and sandstone with trace gravel; trace pyrite and gypsum; slightly calcareous |
| 140 | 160 | 0 | 0 | 0 | 0 | 100 | 0 | brown, gray, and yellow heterolithic sandstone; some iron oxide; slightly calcareous; (sandstone or sandstone gravel clasts of conglomerate?) |
| 160 | 180 | 0 | 0 | 50 | 0 | 50 | 0 | tan-white, yellow, black, gray, and red sand with heterolithic sandstone; sand is fine to coarse and dominantly consists of quartz with minor chert and limestone; trace black carbonaceous material; calcareous; transition between Burro Canyon Formation and Dakota Sandstone? |
| 180 | 200 | 0 | 0 | 100 | 0 | 0 | 0 | tan sand; sand is fine to medium and consists dominantly of quartz with feldspar and chert; trace pyrite; calcareous |
| 200 | 220 | 90 | 10 | 10 | 0 | 0 | 0 | tan, gray, and green chert and limestone gravel with fine to medium sand and clay; calcareous |
| 220 | 240 | 50 | 0 | 50 | 0 | 0 | 0 | tan, brown, gray, green, sand with gravel (limestone and chert) trace pyrite; sand is fine to coarse and consists of quartz, feldspar, and lithic fragments; (some clasts have rind/conglomerate?); trace pyrite; calcareous |

*unc=unconsolidated; ms=mudstone, sandy mudstone, and siltstone; ss=sandstone; ls=limestone

| **Depth Range** (feet) | | **PERCENTAGES** | | | | | | **COMMENTS** |
|---|---|---|---|---|---|---|---|---|
| | | unc* | disaggregated | | consolidated | | | |
| | | sand/ gravel | ms* | ss* | ms* | ss* | ls* | |
| 240 | 260 | 0 | 0 | 0 | 75 | 25 | 0 | green mudstone and sandy mudstone with minor green-white fine- to medium grained sandstone; chert; pyrite; calcareous |
| 260 | 280 | 0 | 0 | 0 | 90 | 10 | 0 | green mudstone and sandy mudstone; trace chert; non calcareous; Brushy Basin Member of the Morrison Formation? |
| 280 | 300 | 0 | 0 | 0 | 100 | 0 | 0 | red and green mudstone, sandy mudstone, and siltstone; non calcareous |
| 300 | 320 | 0 | 0 | 0 | 10 | 90 | 0 | light and medium green very fine-grained sandstone with siltstone, mudstone, and sandy mudstone; non calcareous |
| 320 | 340 | 0 | 0 | 0 | 90 | 10 | 0 | “ |
| 340 | 360 | 0 | 0 | 0 | 100 | 0 | 0 | green and pink mudstone, sandy mudstone, and siltstone; trace pyrite; non calcareous |
| 360 | 380 | 0 | 0 | 0 | 100 | tr | 0 | “ trace sandstone; chert |
| 380 | 400 | 0 | 0 | 0 | 100 | 0 | 0 | pink with minor green-gray and red sandy mudstone and mudstone; non calcareous |
| 400 | 420 | 0 | 0 | 0 | 100 | tr | 0 | green, gray, black, brown, pink-tan, and yellow mudstone, sandy mudstone, and siltstone; trace black carbonaceous material; calcareous; trace volcanic rock fragment and sandstone |

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| **Depth Range** (feet) | | **PERCENTAGES** | | | | | | **COMMENTS** |
|---|---|---|---|---|---|---|---|---|
| | | unc* | disaggregated | | consolidated | | | |
| | | sand/ gravel | ms* | ss* | ms* | ss* | ls* | |
| 420 | 440 | 0 | 0 | 0 | 100 | 0 | 0 | red and minor green and gray mudstone; non calcareous |
| 440 | 460 | 0 | 0 | 0 | 100 | 0 | 0 | “ |
| 460 | 480 | 0 | 0 | 0 | 100 | 0 | tr | green, tan, red, pink, and gray mudstone and sandy mudstone; trace pyrite; non calcareous |
| 480 | 500 | 0 | 0 | 0 | 100 | 0 | tr | “ green, tan, gray, pink, and tan |
| 500 | 520 | 0 | 0 | 0 | 100 | 0 | tr | “ green, tan, red brown, and gray |
| 520 | 540 | 0 | 10 | 0 | 86 | 2 | 2 | green-gray, gray, and tan-pink clay, sandy mudstone, and fine-grained sandstone and limestone; calcareous |
| 540 | 560 | 0 | 10 | 0 | 86 | 2 | 2 | “ |
| 560 | 580 | 0 | 20 | 0 | 80 | tr | tr | green-gray, tan, and red-brown clay, mudstone, sandy mudstone with trace sandstone and limestone; calcareous |
| 580 | 600 | 0 | 0 | 0 | 100 | tr | 0 | green-gray, green, tan, red-brown, green, and yellow sandy mudstone and mudstone with trace sandstone; calcareous |
| 600 | 620 | 0 | 0 | 0 | 98 | 2 | tr | green, gray, and red-brown sandy mudstone and mudstone with minor sandstone and trace limestone; calcareous |

*unc=unconsolidated; ms=mudstone, sandy mudstone, and siltstone; ss=sandstone; ls=limestone

| **Depth Range** (feet) | | **PERCENTAGES** | | | | | | **COMMENTS** |
|---|---|---|---|---|---|---|---|---|
| | | unc* | disaggregated | | consolidated | | | |
| | | sand/ gravel | ms* | ss* | ms* | ss* | ls* | |
| 620 | 640 | 0 | 0 | 20 | 60 | 20 | tr | tan-gray sand and sandstone with green and red-brown mudstone and sandy mudstone; sand is fine to medium and consists of quartz, feldspar, lithic fragments, and mafic minerals; trace limestone; calcareous |
| 640 | 660 | 0 | 0 | 0 | 80 | 20 | tr | red-brown with minor green mudstone and sandy mudstone with fine-grained sandstone; trace limestone; calcareous |
| 660 | 680 | 0 | 0 | 0 | 80 | 20 | tr | “ |
| 680 | 700 | 0 | 90 | 0 | 10 | 0 | tr | white-tan-gray sand with minor green and red-brown mudstone; sand is fine to medium and dominantly consists of quartz with minor feldspar and lithic fragments; trace limestone, pyrite, and chert; calcareous; Salt Wash Member of the Morrison Formation? |
| 700 | 720 | 0 | 0 | 0 | 90 | 10 | tr | red-brown and green siltstone, mudstone, sandy mudstone, and fine-grained sandstone; sandstone consists of quartz, feldspar, and lithic fragments; trace pyrite; trace limestone; calcareous |
| 720 | 740 | 0 | 0 | 10 | 40 | 50 | 0 | tan-pink sand and sandstone with green and red-brown siltstone, mudstone, and sandy mudstone; trace pyrite; calcareous |

*unc=unconsolidated; ms=mudstone, sandy mudstone, and siltstone; ss=sandstone; ls=limestone

| **Depth Range** (feet) | | **PERCENTAGES** | | | | | | **COMMENTS** |
|---|---|---|---|---|---|---|---|---|
| | | unc* | disaggregated | | consolidated | | | |
| | | sand/ gravel | ms* | ss* | ms* | ss* | ls* | |
| 740 | 760 | 0 | 0 | 90 | 5 | 5 | tr | white-gray sand with minor red-brown and green mudstone and sandstone; sand is fine to medium and dominantly consists of quartz with minor feldspar and lithic fragments; trace limestone; calcareous |
| 760 | 780 | 0 | 0 | 50 | 40 | 10 | tr | “ |
| 780 | 800 | 0 | 0 | 0 | 100 | 0 | tr | red-brown and minor green mudstone, sandy mudstone, and siltstone; trace gypsum and limestone; calcareous |
| 800 | 820 | 0 | 0 | 0 | 90 | 10 | tr | red-brown, green-gray, and green sandy mudstone, mudstone, siltstone with minor white sandstone; trace limestone; calcareous |
| 820 | 840 | 0 | 0 | 20 | 20 | 60 | tr | tan-gray quartz-rich sand with red and green fine-grained sandstone and minor red-brown mudstone, siltstone, and sandy mudstone; trace limestone and gypsum; calcareous |
| 840 | 860 | 0 | 0 | 5 | 90 | 5 | tr | “ red brown with minor green |
| 860 | 880 | 0 | 0 | 0 | 90 | 10 | tr | red-brown and minor green mudstone, sandy mudstone, and siltstone with white fine-grained quartz-rich sandstone and trace limestone; calcareous |
| 880 | 900 | 0 | 0 | 0 | 90 | 10 | tr | “ |

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| **Depth Range** (feet) | | **PERCENTAGES** | | | | | | **COMMENTS** |
|---|---|---|---|---|---|---|---|---|
| | | unc* | disaggregated | | consolidated | | | |
| | | sand/ gravel | ms* | ss* | ms* | ss* | ls* | |
| 900 | 920 | 0 | 0 | 0 | 75 | 23 | 2 | red-brown, purple-brown, and minor green siltstone, mudstone, and fine-grained sandstone with minor limestone; trace pyrite and gypsum; calcareous; trace black carbonaceous material?; calcareous; Summerville Formation? |
| 920 | 940 | 0 | 0 | 0 | 75 | 24 | 1 | “ |
| 940 | 960 | 0 | 0 | 25 | 50 | 25 | tr | tan-pink and white-gray sand, red-brown siltstone and mudstone, and minor green fine- to medium grained sandstone; trace limestone; calcareous |
| 960 | 980 | 0 | 0 | 0 | 75 | 23 | 2 | red-orange siltstone and mudstone with minor green mudstone and gray limestone; red-brown fine-grained sandstone composed of quartz, feldspar, and lithic fragments; calcareous |
| 980 | 1000 | 0 | 0 | 25 | 25 | 50 | tr | pink sand with red-orange fine-grained sandstone and red-brown mudstone; sand is fine to medium and consists of quartz and feldspar; calcareous; Entrada Sandstone? |
| 1000 | 1020 | 0 | 0 | 50 | 25 | 25 | tr | “ |
| 1020 | 1040 | 0 | 0 | 10 | 30 | 60 | 0 | red-orange very fine- to fine-grained sand and sandstone with minor green siltstone; sandstone consists of quartz, feldspar, lithic fragments, and mafic minerals; trace gypsum |

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| **Depth Range** (feet) | | **PERCENTAGES** | | | | | | **COMMENTS** |
|---|---|---|---|---|---|---|---|---|
| | | unc* | disaggregated | | consolidated | | | |
| | | sand/ gravel | ms* | ss* | ms* | ss* | ls* | |
| 1040 | 1060 | 0 | 0 | 10 | 10 | 80 | tr | " trace limestone |
| 1060 | 1080 | 0 | 0 | 50 | 10 | 40 | 0 | red-orange fine-grained sandstone, fine to medium sand, red-brown mudstone, and trace green mudstone; trace chert, gypsum, and pyrite; calcareous |
| 1080 | 1100 | 0 | 0 | 10 | 10 | 80 | tr | pink-orange quartz-rich sand with red-orange very fine to fine-grained sandstone composed of quartz, feldspar, and mafic minerals; red-brown and green mudstone; trace limestone; trace pyrite; slightly calcareous |
| 1100 | 1120 | 0 | 0 | 0 | 50 | 50 | 0 | red-brown, red-orange, green, and black very fine- to fine-grained sandstone and mudstone; trace gypsum; calcareous |
| 1120 | 1140 | 0 | 0 | 0 | 10 | 90 | 0 | " |
| 1140 | 1160 | 0 | 0 | 20 | 5 | 75 | 0 | red-orange and gray quartz-rich sand and red-orange sandstone with minor green mudstone; sandstone consists of quartz, feldspar, lithic fragments, and mafic minerals; trace pyrite; calcareous |
| 1160 | 1180 | 0 | 0 | 20 | 5 | 75 | 0 | " |
| 1180 | 1200 | 0 | 0 | 75 | 5 | 20 | 0 | " pink gray sand with red-orange and green mudstone |

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|---|---|---|---|---|---|---|---|---|
| | | unc* | disaggregated | | consolidated | | | |
| | | sand/ gravel | ms* | ss* | ms* | ss* | ls* | |
| 1200 | 1220 | 0 | 0 | 0 | 99 | 0 | 1 | brown with minor green and red-orange mudstone and sandy mudstone; minor limestone; trace gypsum; calcareous |
| 1220 | 1240 | 0 | 0 | 50 | 50 | 0 | tr | brown, white, and minor green sand with mudstone and sandy mudstone; sand is fine to medium and dominantly consists of quartz with minor feldspar and lithic fragments; trace limestone; calcareous |
| 1240 | 1260 | 0 | 0 | 90 | 10 | 0 | 0 | white-pink-gray fine to medium quartz-rich sand with red-brown and green mudstone; trace pyrite and gypsum crystals; calcareous |
| 1260 | 1280 | 0 | 0 | 90 | 10 | 0 | 0 | " slightly calcareous |
| 1280 | 1300 | 0 | 0 | 98 | 2 | 0 | 0 | yellow-white fine to medium quartz-rich sand with minor red-brown and green mudstone; trace pyrite; slightly calcareous |
| 1300 | 1320 | 0 | 0 | 90 | 10 | 0 | 0 | " |
| 1320 | 1340 | 0 | 0 | 0 | 50 | 50 | 0 | red-brown and minor green mudstone with white-gray medium-grained quartz-rich sandstone and red-orange fine-grained sandstone composed of quartz, feldspar, and mafic minerals; calcareous |

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| **Depth Range** (feet) | | **PERCENTAGES** | | | | | | **COMMENTS** |
|---|---|---|---|---|---|---|---|---|
| | | unc* | disaggregated | | consolidated | | | |
| | | sand/ gravel | ms* | ss* | ms* | ss* | ls* | |
| 1340 | 1360 | 0 | 0 | 20 | 10 | 70 | tr | red-orange, red-brown, and minor green fine to medium sand, mudstone, and fine-grained sandstone; trace limestone; calcareous |
| 1360 | 1380 | 0 | 0 | 50 | 10 | 40 | tr | orange-pink quartz-rich fine to medium sand with red-brown mudstone and red-orange very fine- to fine-grained sandstone composed of quartz, feldspar, lithic fragments, and mafic minerals; trace limestone; calcareous |
| 1380 | 1390 | 0 | 0 | 80 | 10 | 10 | 0 | " slightly calcareous; no limestone |
| 1390 | 1400 | 0 | 0 | 50 | 10 | 40 | 0 | " trace chert |
| 1400 | 1410 | 0 | 0 | 25 | 25 | 50 | tr | red-orange quartz-rich sand, brown mudstone and siltstone, and pink-orange fine-grained sandstone composed of quartz, feldspar, and mafic minerals; trace limestone and gypsum; slightly calcareous |
| 1410 | 1420 | 0 | 0 | 50 | 25 | 25 | tr | " |
| 1420 | 1430 | 0 | 0 | 95 | 5 | 0 | 0 | yellow-white quartz-rich fine to medium sand with minor green and red mudstone; trace pyrite; calcareous |
| 1430 | 1440 | 0 | 0 | 90 | 10 | 0 | 0 | " trace bladed gypsum |

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| **Depth Range** (feet) | | **PERCENTAGES** | | | | | | **COMMENTS** |
|---|---|---|---|---|---|---|---|---|
| | | unc* | disaggregated | | consolidated | | | |
| | | sand/ gravel | ms* | ss* | ms* | ss* | ls* | |
| 1440 | 1450 | 0 | 0 | 10 | 70 | 20 | 0 | red-brown siltstone, green mudstone, pink-orange sand, and red-orange very fine-grained sandstone; trace chert, gypsum, and black carbonaceous material; calcareous; Carmel Formation? |
| 1450 | 1460 | 0 | 0 | 50 | 50 | 0 | tr | pink-yellow quartz-rich fine to medium sand with red-brown siltstone and green mudstone; trace limestone; trace pyrite, black carbonaceous material, and gypsum; calcareous |
| 1460 | 1470 | 10 | 0 | 0 | 80 | 10 | 0 | red-brown, red-orange, gray, green, tan, and yellow siltstone and mudstone with white sandstone; trace gypsum, limestone, chert, and igneous rock clasts; trace black carbonaceous material; conglomerate?; calcareous |
| 1470 | 1480 | 10 | 0 | 80 | 10 | 0 | 0 | pink-orange sand with with red-brown, red-orange, green, and gray siltstone and mudstone; trace limestone, chert, volcanic rock clasts; trace black carbonaceous material; conglomerate?; calcareous |
| 1480 | 1490 | 10 | 0 | 20 | 20 | 50 | 0 | pink-orange sand and sandstone with with red-brown, red-orange, green, and gray siltstone and mudstone; trace limestone, chert, volcanic rock clasts; trace black carbonaceous material; conglomerate?; calcareous |

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| **Depth Range** (feet) | | **PERCENTAGES** | | | | | | **COMMENTS** |
|---|---|---|---|---|---|---|---|---|
| | | unc* | disaggregated | | consolidated | | | |
| | | sand/ gravel | ms* | ss* | ms* | ss* | ls* | |
| 1490 | 1500 | 5 | 0 | 80 | 10 | 5 | 0 | " bladed gypsum |
| 1500 | 1520 | 0 | 0 | 90 | 10 | 0 | 0 | pink-white-gray quartz-rich sand with minor feldspar and lithic fragments and minor red and green mudstone; trace chert; slightly calcareous; Navajo Sandstone? |
| 1520 | 1540 | 0 | 0 | 95 | 5 | 0 | 0 | " |
| 1540 | 1560 | 0 | 0 | 95 | 5 | 0 | 0 | " |
| 1560 | 1580 | 0 | 0 | 90 | 5 | 0 | 5 | " |
| 1580 | 1600 | 0 | 0 | 90 | 2 | 0 | 8 | " |
| 1600 | 1620 | 0 | 0 | 80 | 2 | 0 | 18 | " |
| 1620 | 1640 | 0 | 0 | 80 | 2 | 0 | 18 | " |
| 1640 | 1660 | 0 | 0 | 90 | tr | 0 | 10 | " trace mudstone |
| 1660 | 1680 | 0 | 0 | 90 | tr | 0 | 10 | " |
| 1680 | 1700 | 0 | 0 | 90 | tr | 0 | 10 | " |
| 1700 | 1720 | 0 | 0 | 95 | tr | 0 | 5 | " |
| 1720 | 1740 | 0 | 0 | 90 | tr | 0 | 10 | " |
| 1740 | 1760 | 0 | 0 | 95 | tr | 0 | 5 | " |
| 1760 | 1780 | 0 | 0 | 95 | 0 | 0 | 5 | " no mudstone |
| 1780 | 1800 | 0 | 0 | 95 | 0 | 0 | 5 | " |

*unc=unconsolidated; ms=mudstone, sandy mudstone, and siltstone; ss=sandstone; ls=limestone